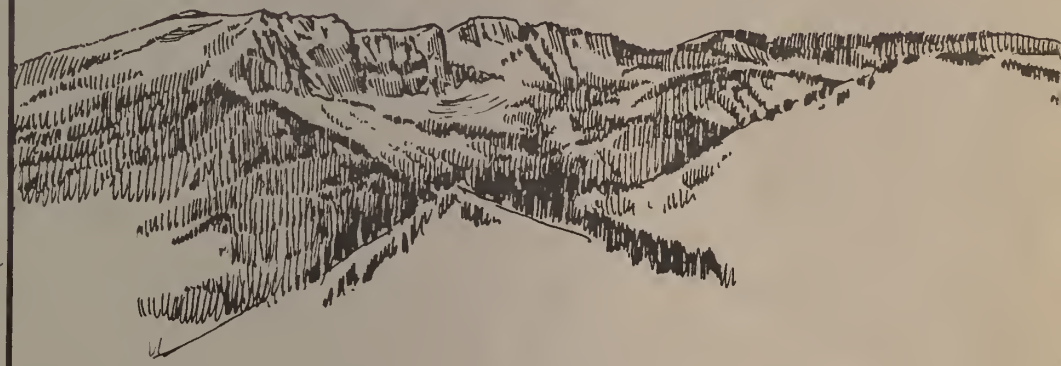
Grizzly Bear Management

In the Thompson Falls area
and adjacent environs



Grizzly Bear Management

In the Thompson Falls area and adjacent environs

LOLO & KOOTENAI NATIONAL FORESTS

U. S. Department of Agriculture
Forest Service / Northern Region
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PREFACE

The grizzly bear was classified September 1, 1975, by the Fish and Wildlife Service, U.S. Department of Interior, as a threatened species. Of the estimated 12,000,000 acres of the great bear's habitat in the United States (excluding Alaska), 6,000,000 acres are in Montana.

In western Montana the Lolo National Forest contains two geographic areas occupied by grizzly bear. In 1973 the Forest began a program to insure viable grizzly bear habitat.

First, interim guidelines were adopted for management of the bear's habitat. These guidelines are intended to provide management direction that will act to conserve the ecosystems relevant to the grizzly's welfare, pending the development of more specific information on the bear and its forest habitat.

Then, Dr. Albert W. Erickson, Bellevue, Washington, an internationally recognized bear ecologist, was retained in 1973 to assess the capability of a portion of the Seeley Lake Ranger District, bordering the Scapegoat and Bob Marshall Wildernesses, to support grizzly bear. A report of Dr. Erickson's assessment was published in 1975.

In 1974 the Forest Service awarded a second contract to Dr. Erickson, this time to assess the capability of the Thompson Falls area, in the Lolo and Kootenai National Forests, to support grizzly bear. The major similarity between this contract area and the Seeley Lake study area is that both are non-wilderness, coniferous ecosystems.

This booklet documents Dr. Erickson's Thompson Falls study. It contains both information and judgment. The Forest Service will consider this study along with the results of other studies in striving to insure the integrity of the grizzly bear habitat in the Thompson Falls area. This study report is a viable addition to the growing knowledge base concerning the habits and requirements of this magnificent animal.

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ABSTRACT

An evaluation of the Thompson Falls Ranger District of the Lolo National Forest and adjacent areas was made to assess the grizzly bear management potential of this western Montana area. The evaluation led to the conclusion that the District has good management potential, particularly the central, upper mountain complex centered on Mt. Headley together with major components of the slopes lying along the southwest border of the District. With specific management, this area is deemed capable of supporting a small (ca. 4-8) resident population of grizzlies. Specific management judged necessary for success in this effort concerned (1) limiting the current high human access into the core habitat areas, and (2) habitat management.

Recommended habitat management in areas identified as prime grizzly habitat includes maintaining a larger portion of the areas in pioneer and shrub vegetational stages. Initially this would entail arresting and reversing the current forest succession. This would involve initiating procedures to enlarge and coalesce the prime, open habitat areas. Procedures proposed to accomplish this objective include controlled burning and/or selective suppression of natural fires. Besides enlarging the amount of prime habitat, this action would conceivably discourage movement of bears out of the core management area.

Equally important to any attempt to manage the grizzly in the Thompson Falls area would be the establishment of a protective zone surrounding the core management areas. Besides providing a buffer against undue human access, the buffer zone could be managed to create a vegetative habitat that would be unattractive to grizzlies. The animals would, thus, be behaviorally dissuaded from crossing the buffer zone. The proposed minimum width of the buffer zone is 1 mile. It is proposed that the habitat state of the buffer zone be closed canopy forest types.

The relationship of the grizzly of the Thompson Falls area was also explored relative to the population extant in the adjacent Kootenai National Forest, particularly the Cabinet Mountains Wilderness. Recommendations were advanced for integrating the management of the two stocks.

Management recommendations relating directly to the grizzly in the Thompson Falls area include procedures for assessing population status. The proposed procedures include use surveys based on bear sign and close assessments of human-induced mortalities.

INTRODUCTION

This report presents an evaluation of portions of the Thompson Falls and Plains Ranger Districts of the Lolo National Forest and of the Cabinet Ranger District of the Kootenai National Forest as habitat for grizzly bears (*Ursus arctos horribilis*) and proposes management recommendations. The study was performed under U.S. Forest Service Contract Number 26-3405, awarded to the author May 1, 1974.

Broad objectives of the study were:

1. To delineate the boundaries of an area within which grizzly bear habitat management could be effected.

2. Within the areas established, to identify existing and potential seasonal key grizzly bear habitats and propose management thereof.

3. To qualify, or rate, this grizzly bear habitat with that located throughout the United States, including Alaska.

The area evaluated in this report (figure 1) includes a prime area totaling approximately 280 square miles in portions of the Thompson Falls and Plains Ranger Districts of the Lolo National Forest and a secondary area of 200 square miles peripheral to the prime study area, particularly a portion of the Cabinet Ranger District of the Kootenai National Forest. The study area is bordered to the west, south, and east by the heavily agriculturized Clark Fork River Valley. To the north and northwest the area is contiguous with portions of the Kootenai National Forest. These areas also harbor grizzly bears, particularly the Cabinet Mountains Wilderness. The relation of these

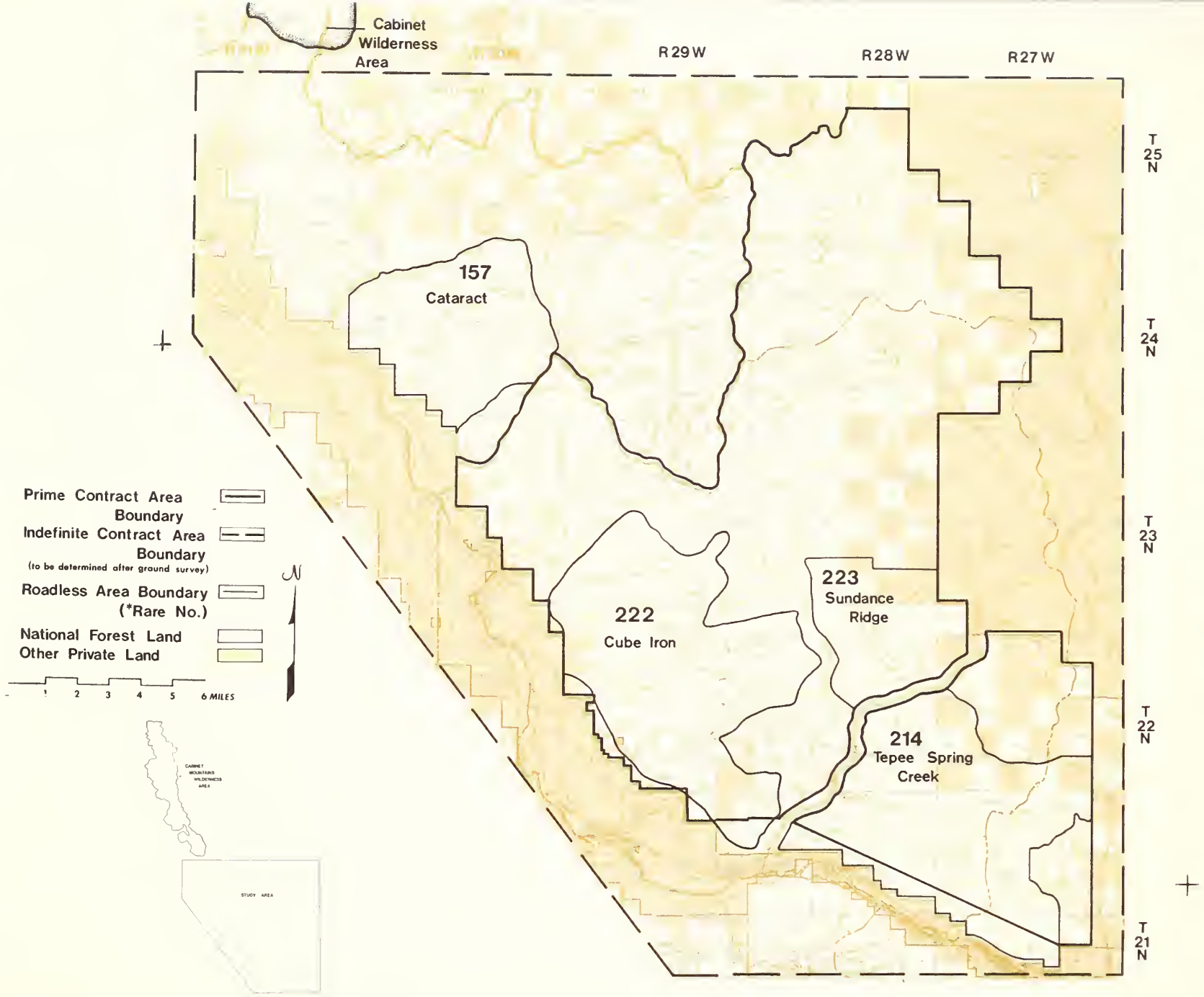

Figure 1. Grizzly Bear Management Study Area

U.S.D.A./Forest Service *Roadless Area Review and Evaluation

stocks to those of the Thompson Falls study area was explored only slightly in the evaluation.

METHODS

The methodology employed in the development of this report concerned; first, a review of maps, reports, and records of the Thompson Falls, Plains, and Cabinet Ranger Districts; second, a 8-day field reconnaissance of the study area; and third, discussions of the project with Forest Service officials.

The reports and records reviewed included:

1. Historical grizzly bear information - Thompson Falls Ranger District and selected areas of the Plains and Cabinet (Trout Creek) Ranger Districts, file designation 2620. Compiled by Gary Halvorson, September 19, 1974.

2. Guidelines for management of grizzly bear habitat in the non-wilderness system, Lolo National Forest, file designation 2630, June 1973.

3. Study area fire history from 1910 to present.

4. Grazing allotment and mining claim maps.

5. Marginally commercial and non-forest land map.

6. Landownership map.

7. Generalized plant community and land development status map.

8. Brief summary of grazing history with a map of the 1937 allotments.

9. Access road and trail system status map.

10. General cutover map.

11. Contract area, roadless areas, and multiple use planning unit maps.

12. Elevation maps.

13. Final Environmental Statement, Multiple Use Plan, Cube Iron-Silcox Planning Unit, Thompson Falls Ranger District, Lolo National Forest, U.S. Forest Service, 1974.

The field reconnaissance was conducted from September 29 to October 6, 1974 (figure 2). The 8-day reconnaissance entailed first a thorough 2-hour, fixed-wing aerial examination of the study area and adjacent areas, particularly the Cabinet Mountain region north of the contract area. William O'Brien, Cabinet District Ranger, Kootenai National Forest, and William R. Franks, Thompson Falls District Ranger, Lolo National Forest, accompanied the contractor on the reconnaissance. The reconnaissance provided the contractor with orientation and a first approximation of the Thompson Falls area as possible grizzly bear habitat, particularly as regarded the general physiognomy of the area, spatial relationships and area use.

Five days of horseback and foot trips were subsequently made into the core of the study area, as depicted in figure 2. Personnel participating in these trips as advisors to the contractor were: Don Nelson, Ranger, Plains Ranger District, Lolo National Forest; William O'Brien and William R. Franks, District Rangers, Kootenai and Lolo National Forests, respectively; Wildlife Biologists Gary Halvorson and Robert Hensler of the Lolo and Kootenai National Forests, respectively; Richard Smith, Resource Assistant, and Fred Cavill, Fire Control Officer, Plains Ranger

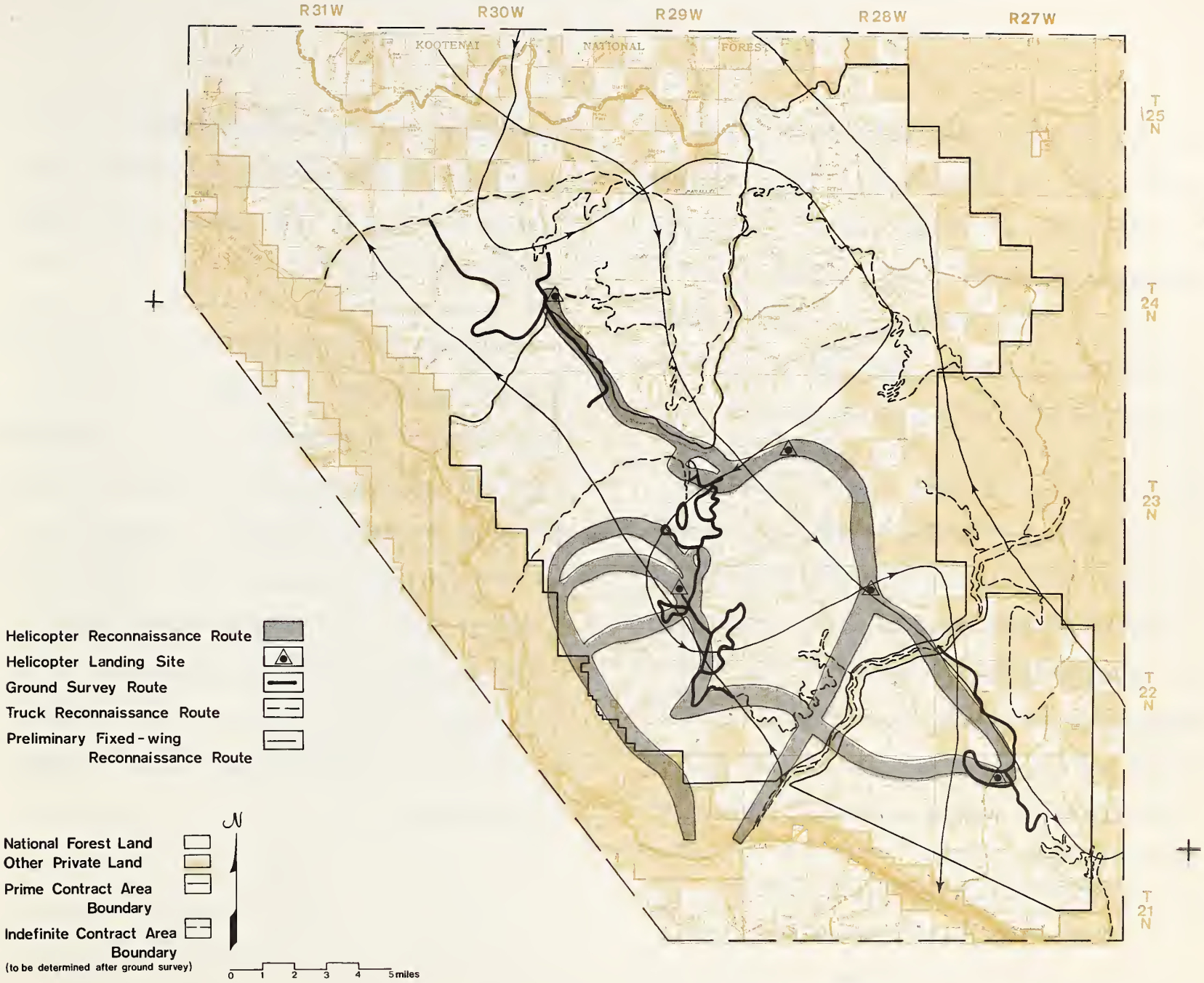

Figure 2. Distribution of the Field Reconnaissance Effort

District; Arthur Howell, Resource Assistant, Cabinet Ranger District; Richard Browne, Forestry Technician and Jack Fisher, Resource Assistant, Thompson Falls Ranger District. Supplemental to this effort, several trips were made into peripheral areas of the study area in four-wheel-drive vehicles (figure 2).

On these trips, judgments were made as to the attractiveness of the areas traversed as bear habitat. Close searches were made for evidence of bear sign, both recent tracks and droppings, and of longer enduring sign such as torn and ripped logs and stumps, turned boulders and trees, and Forest Service informational signs which had been bitten and/or clawed by bears.

The concluding reconnaissance concerned aerial examination of portions of the study area from a Bell G3B helicopter. Low-level examinations were made of areas thought to be potentially valuable as grizzly bear habitat and landings were made at three key points for ground examinations (figure 2).

Particular attention was given in the field effort to judge the suitability of the study area as grizzly habitat on the basis of current management, stage of plant succession, and possible later use and future successional stages. Consideration was also given to evidence of past, present, and possible future forest management practices as (1) affecting the welfare of the grizzly and (2) assessing the value of that use if the grizzly were given prime management consideration within the study area.

PAST AND RECENT EVIDENCE OF THE DISTRIBUTION AND ABUNDANCE OF THE GRIZZLY BEAR WITHIN THE STUDY AREA

Only cursory information exists on the distribution and abundance of the grizzly bear within the study area. A compilation of records prepared by Gary Halvorson, Lolo National Forest Wildlife Biologist, is on file in the Lolo and Kootenai National Forests Supervisors' Offices and the Thompson Falls, Plains, and Cabinet (Trout Creek) Ranger Districts under file designation 2620 (September 19, 1974). A summary of the locations of these records is presented as figure 3 in this report. These records include information about kills and observations of bears and of their sign. Unfortunately, only limited basis exists for judging the veracity of many of the reports, particularly the more dated ones, since many are simply individual recollections, notably of long-time residents of the area including ranchers, outfitters and guides, and Forest Service personnel. The fact that the black bear occurs throughout the area introduces another possible source of error because even persons knowledgeable about bears can at times have difficulty identifying the two species or their sign.

Despite these reservations, data developed by Halvorson leave little doubt that a major portion of the study area has been frequented by the grizzly bear over the past 50 years (figure 3). The bulk of the records cluster along the high mountain belt between Mt. Silcox and Liver Peak on the south to Mt. Headley on the north. Another set of records covers the Sundance Ridge from Mt. Priscilla on the south to Stony Lake on the

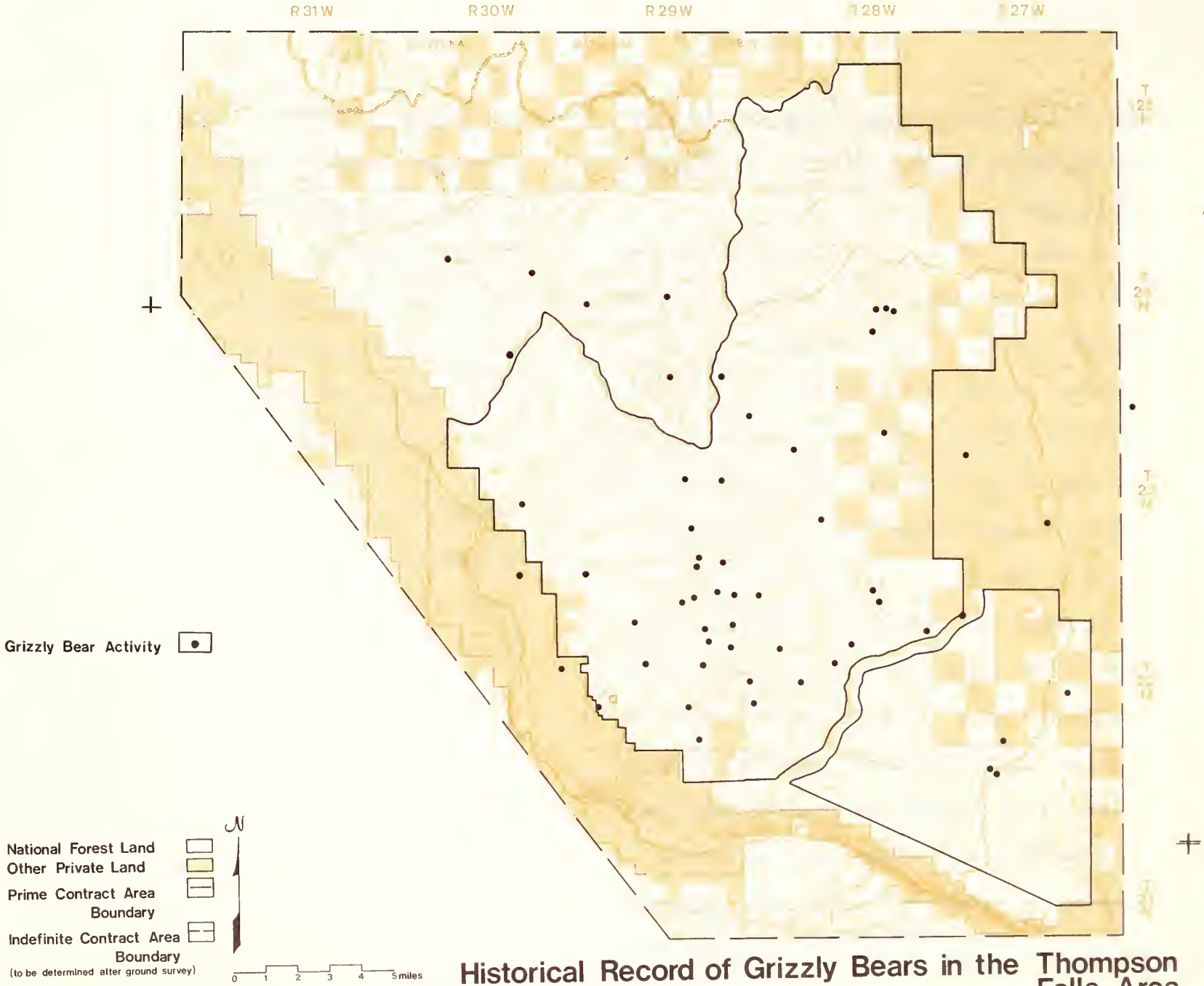

Figure 3.

Historical Record of Grizzly Bears in the Thompson Falls Area

(modified from the report "Historical Grizzly Bear Information, Thompson Falls Ranger District and Selected Areas of the Plains and Cabinet (Trout Creek) Ranger Districts," September 19, 1974, Halvorson).

north. These two high mountain ridges join together at their northern ends. They are further contiguous with a major ridge extending to Seven Point Mountain and Cataract Peak to the northwest and with another ridge extending due north to Two Trees Peak (figure 4).

The historical records show that two-thirds of the location information is from elevations above 5,000 feet, an area comprising only about one-third of the total contract area (figure 4).

The paucity of records for the area along the ridge complexes extending north and northwest from Mt. Headley and in the open grassland areas extending south from Seven Point Mountain is surprising (figures 3 and 5). These areas appear to be highly attractive grizzly range. They are of the same general character as the area along the Mt. Silcox-Mt. Headley ridge belt, which has abundant records. The lack of records for these areas suggests either a data compilation bias or a low attraction of the area to the grizzly. The former is considered to be more likely.

From the data at hand, it is difficult to assess either the past or current status of the grizzly in the Thompson Falls area. The sparse 50-year observational record reflected in Halvorson's compilation suggests that the species was never abundant during the recording period. Of the recorded data, the kill record is perhaps the most meaningful. These data show a meager but sustained level of kill over the past 5 decades (table 1). A total of four kills are documented for the period 1970-74, three for 1970, and one for 1972.

No kills or observations of grizzlies were documented in the Thompson Falls area for

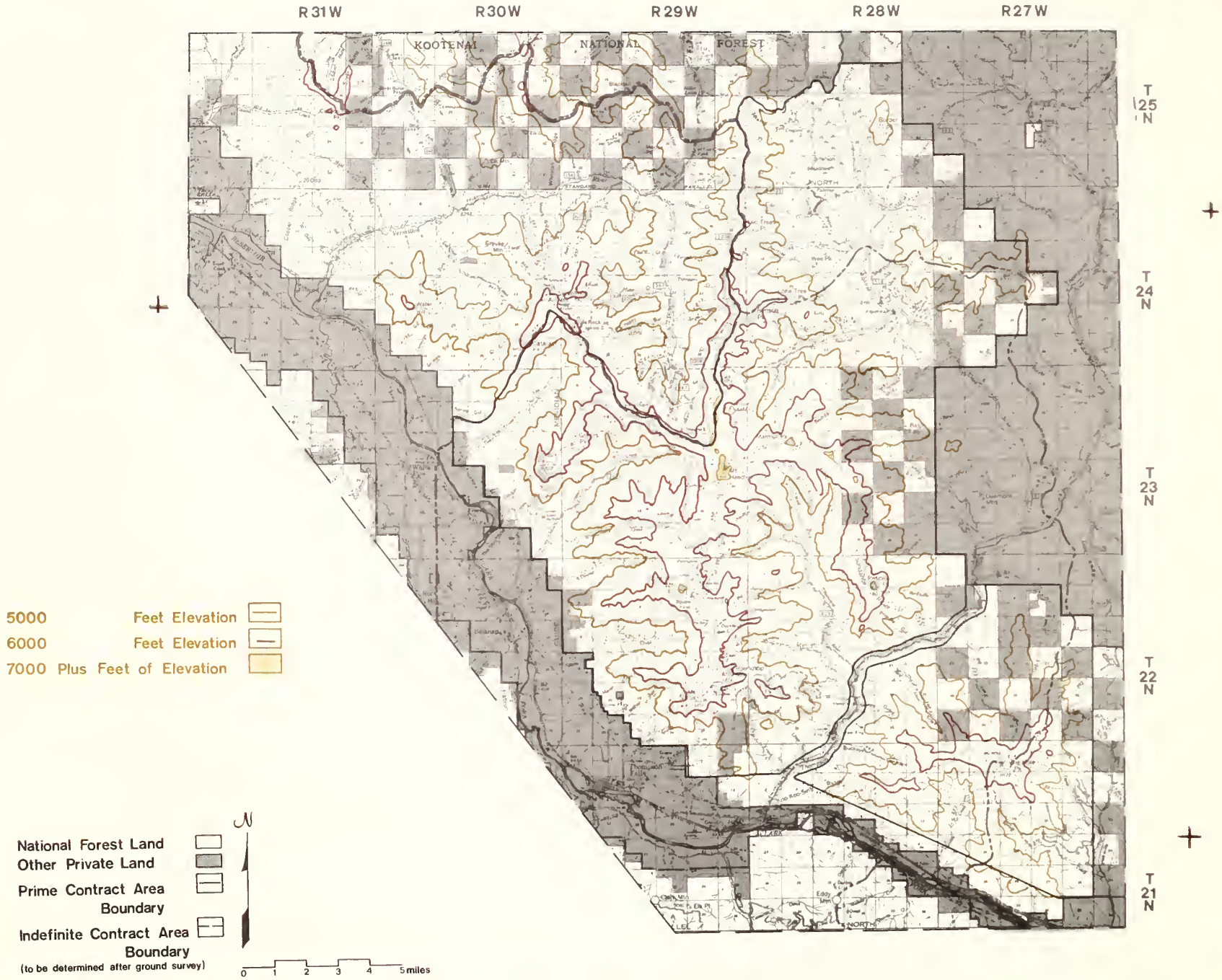

Figure 4. Elevational Contours within the Thompson Falls Area

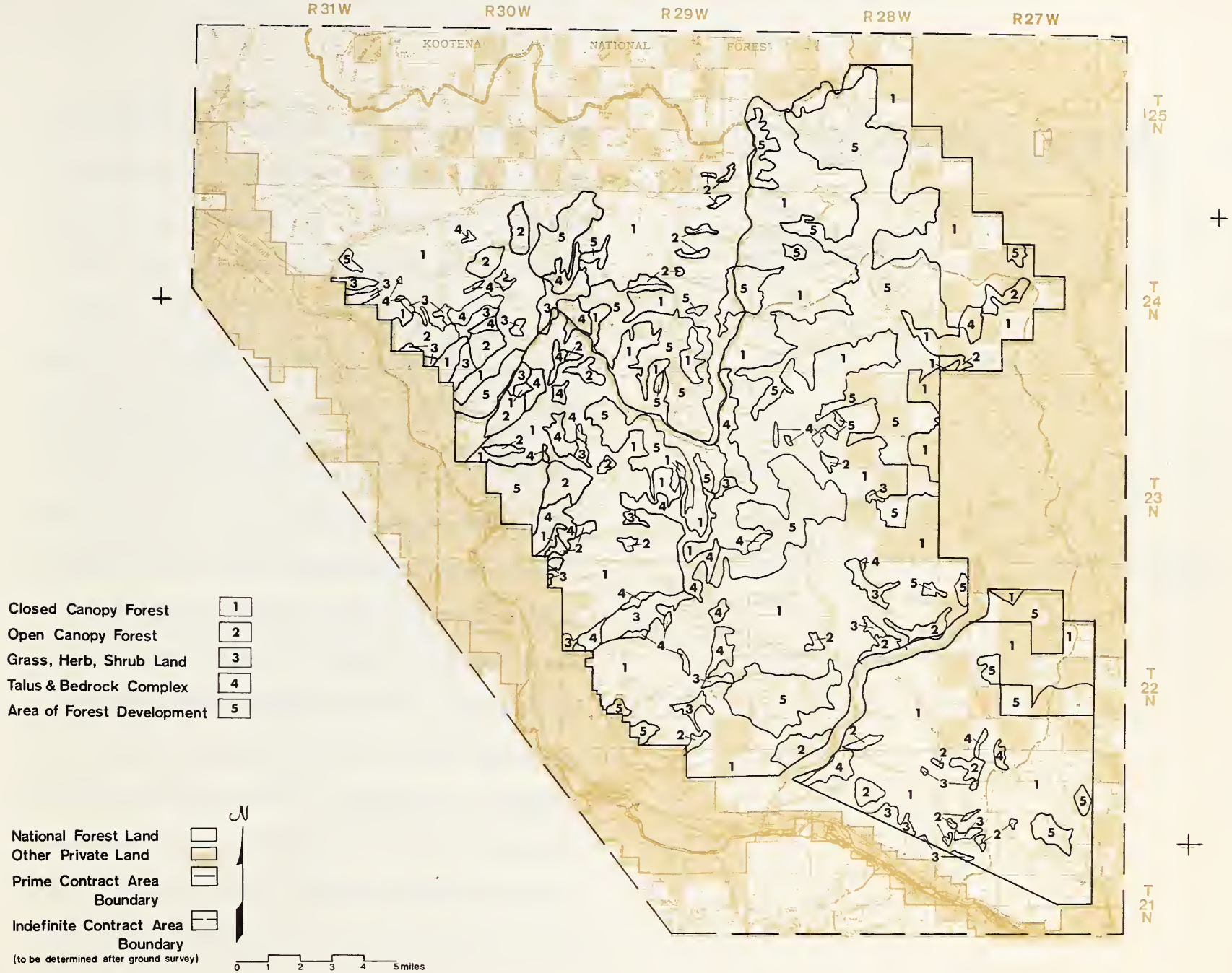

Figure 5. Generalized Plant Communities and Land Development Map

Table 1. Recorded Grizzly Bear Kill Instances and Number Killed per Decade or Partial Decade (After Halvorson, 2620, 9/74)

Decade	Kill Instances		Individuals Killed	
	Total No.	% of Total	Total No.	% of Total
1920's	2	10	2	7
1930's	7 1/	35	7	26
1940's	1	5	1	4
1950's	4	20	7	26
1960's	3	15	6(7)	22
1970-74	3	15	4	15
Total	20		27(28)	

1/ Assuming that each of the 7 were killed at different time periods.

the years 1973 or 1974. This raises the question of possible recent extirpation of the species from the area. The lack of observations during these 2 years is the more significant in view of the fact that a greater attempt was made to obtain 1973-74 observation and kill records. To examine this possibility, the kill and observation record was examined for the period 1964-1974 (table 2).

These data suggest a possible recent loss of the grizzly from the Thompson Falls area. This loss is not suggested on the basis of numbers of bears observed, however, since this factor is confounded by possible repeat observations of bears and observations of family groups. Rather, the loss is suggested by the consistent observation of bears over the years prior to 1973 and the absence of observations of grizzlies in 1973 and 1974. However, since verification of records

for the pre-1973 period were less rigorous than for the post-1972 years, it is too early to adjudge a sudden status change for the grizzly in the Thompson Falls area.

A final assessment, which should be attempted from the historical record of grizzly bears in the Thompson Falls area, is whether the grizzly is now or ever was a permanent resident of the area. The historical record documents observations over time and tabulates kills in the area for every month of the year except the period December through March, when the animals would have been in their winter dens. All age and sex categories are represented in the records. These factors lead to the judgment that the study area is year-long grizzly bear habitat and thus the grizzly bear can be considered a permanent resident of the region. However, this

Table 2. Observations and Kills of Grizzly Bears in the Thompson Falls Area During the Period 1964-1974.1/

Year	Observations of Grizzlies	Documented Kills
1964	3	2
1965	4	0
1966	3	0
1967	8	0
1968	6	0
1969	3	1
1970	10	3
1971	6	0
1972	3	1
1973	0	0
1974	0	0

1/ Compiled from data presented in Halvorson, 1974 (see figure 4).

does not necessarily mean that a specific population or individual bear is a year-long resident within the area.

EVIDENCE OF THE GRIZZLY FROM FIELD RECONNAISSANCE

The field reconnaissance, though abbreviated in time, was intense in effort. The reconnaissance was efficiently performed as a result of (1) the investigator being furnished helpful data on the District prior to the field effort, (2) the well-coordinated field effort arranged by Halvorson and his associates, and (3) the active assistance of Forest Service personnel familiar with the study area. The result was that all significant portions of the study area were examined in sufficient detail to assess the apparent current status of the grizzly in the study area and to evaluate the area as grizzly bear habitat. The field reconnaissance was augmented by aerial examinations of areas adjacent to the Thompson Falls District, particularly the Cabinet Mountain Wilderness to the immediate north.

Figure 6 presents the locations of bear sign observed during the field reconnaissance. Of the 114 total observations of bear sign, 36 were considered grizzly sign. Of these, 10 were thought quite positively to be those of grizzly bears. The bulk of this sign was quite dated and included bite and claw markings on trees and Forest directional signs (photo 1). In several instances, long, light-tipped hairs judged to be that of grizzlies were found clinging to trees and informational signs that had been clawed and bitten by bears. A sign type, though not recent, yet believed quite certainly to be

Photo 1. Forest directional sign clawed and bitten by bears

Photo 2. Forest meadow area extensively dug up by bear searching for pocket gophers. Location: between Cabin and Carbine Lakes.

that of grizzlies was several areas where bears had dug extensively for pocket gophers or ground squirrels (photo 2). An area at the edge of a small clearing measuring approximately 20 feet long and 15 feet wide and deeply excavated was also judged to be the work of grizzlies (photo 3). The object sought at this site is unclear. A fair guess would be red squirrels and/or their middens.

Three recent signs were judged to be those of grizzlies. The first was at Deer Lake near Round Top Mountain where a large bear track and other bear sign were observed. The second was

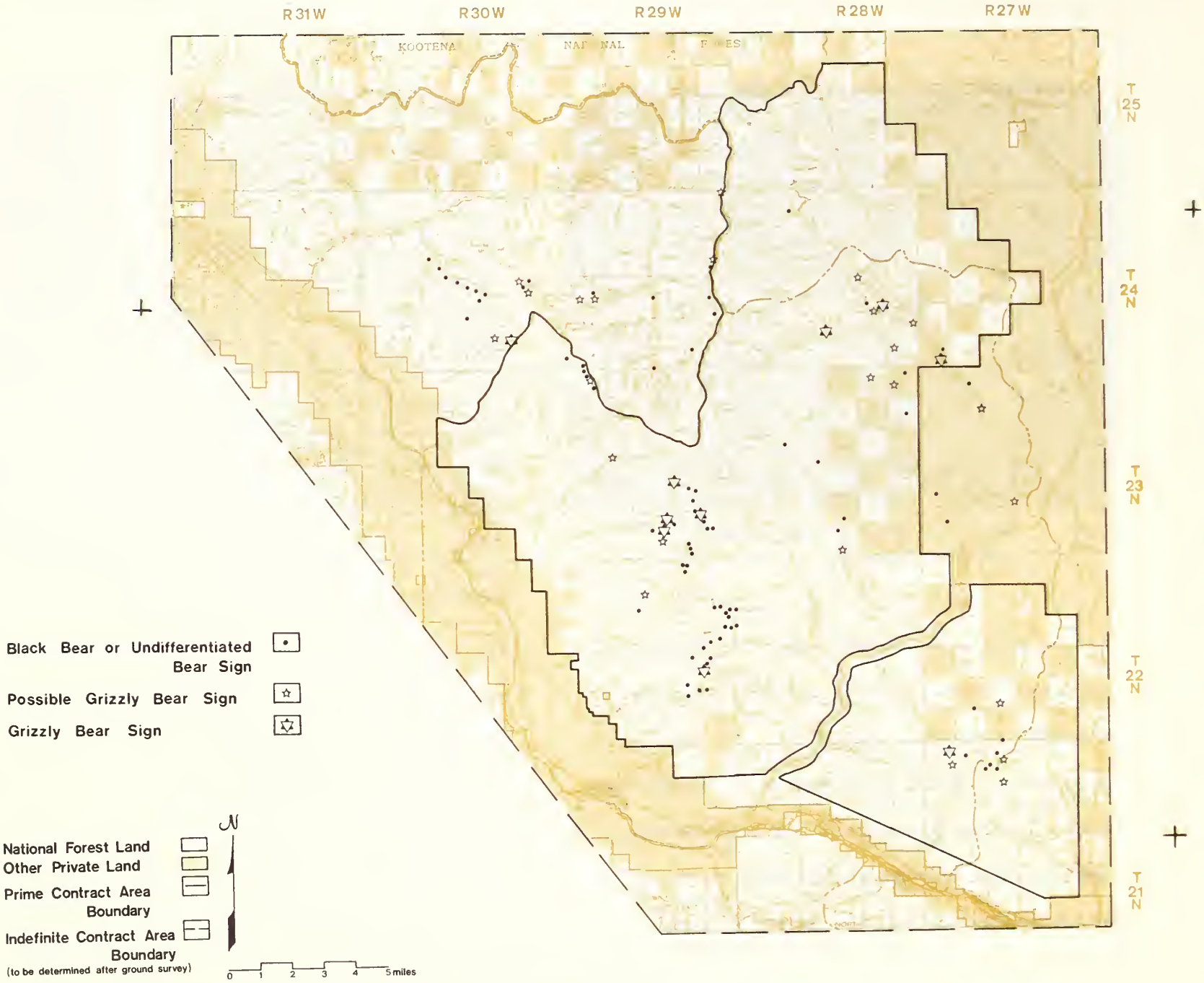

Figure 6. Locations of the Sign of Bears Observed During the Field Reconnaissance Effort

Photo 3. District ranger, William R. Franks, standing in an area extensively excavated by bears. Location: between Winnemucha and Cabin Lakes.

just to the north at Graves Lake where an area had been extensively excavated by a bear and where three large scat piles were located. The third was at Cataract Peak where an area of rock diggings and a scat pile containing predominantly small mammal hair was found.

Bear signs observed during the field reconnaissance were sufficient to convince me that the grizzly bear is still extant in the Thompson Falls area. The sparsity of recent sign suggests, however, that the presence of the species in the area is exceedingly low.

It is significant that the location of the bear sign observed during the field reconnaissance corresponded closely with that documented in the historical record (figures 3 and 6). The principal difference between the two records was that the historical records were more generally distributed, including a number of records at the periphery of the study area. This difference is logical inasmuch as the historical record would be expected to include infrequent occurrences of bears away from core areas. A further difference between the two records is the

more uniform distribution of the reconnaissance observations of grizzly sign throughout the high mountain region of the study area than was evident in the historical record. This suggests a more general use of these areas by grizzlies than is apparent from the historical record (figures 3 and 6). Unfortunately, the reconnaissance effort did not include a ground search of the grassland habitat directly south of Cataract Peak. However, from the aerial examination, the area was judged to be good grizzly habitat.

As with the historical record, most of the reconnaissance observations judged to be those of grizzlies were between Mt. Silcox and Mt. Headley. These records appeared to be a continuation of those of the Cataract Peak and Seven Point Mountain area. Interestingly, both the historical record and the reconnaissance observations show an isolated grouping of grizzly reports in both the Fish Trap and Big Hole Peak areas (figures 3 and 6). The relation of these records to the Mt. Silcox-Mt. Headley-Seven Point Mountain complex is unclear. However, I would suspect a close interrelationship between the grizzlies in the several areas. The lack of historical documentation and recent reconnaissance sign of bears between the several areas is likely attributable to the interconnecting area being unattractive habitat for the grizzly. Consequently, the animals presumably seldom loiter in these interconnecting areas, if at all. Less clear, however, is the explanation for the scant number of grizzly records for the Sundance Ridge area between Priscilla Peak and Marmot Peak and for the ridge complex extending between Mt. Headley and Two Trees Peak (figures 3 and 6). These

ridges are contiguous with the Mt. Silcox-Seven Peaks ridge complex (figure 4) and would seem to have greater attraction to the grizzly. However, the contrary is the case presumably because the areas are heavily forested (see beyond).

EVALUATION OF THE STUDY AREA AS GRIZZLY HABITAT

Three prime considerations bear on the suitability of the Thompson Falls area as habitat currently or potentially suitable for management of the grizzly. These include (1) the spatial sufficiency of the area to satisfy the normal mobility traits of the species, (2) the support capabilities of the area for the grizzly, and (3) the compatibility of the grizzly with other resource uses of the area. Although the three considerations are not independent, an attempt will be made to examine each in this analysis.

SPATIAL SUFFICIENCY

Not surprisingly, there is not a large body of data detailing the movement traits and home range sizes of the brown bear.[1/] Sufficient information exists, however, to permit the judgment that the normal movements of the grizzly bear are quite limited, despite popularly held views to the contrary. Radio-tracking studies conducted on Kodiak Island by Berns and Hensel (1972) determined that 14 radio-tracked bears confined their principal activities to an average area of only 5.5 square miles. The average maximum between-point movement of these animals was 12.5 linear miles (range 5.0 to 29.4). The maximum movements between points were usually associated with movements between winter dens and the major summer activity centers.

1/ The grizzly is but one subform of the European-Asian and American brown bear (*Ursus arctos*).

In a study of the grizzly bear in the Yukon Territory, Pearson (1972) reported the average home range size of eight female grizzlies as 27 square miles and that of an unstated number of males was 114 square miles. Craighead and Craighead (1962) reported that the home ranges of 10 radio-tagged Yellowstone grizzlies of mixed sexes and ages averaged 41.9 square miles. The minimum and maximum ranges of these animals were 8 and 168 square miles, respectively.

The spatial requirements of grizzly bears can further be inferred from the minimum sizes of areas where the species persists in relic status. Noteworthy among these populations are the 19 to 20 insular populations extant in Europe (Curry-Lindahl, 1972). Most of these populations occupy areas smaller than the Thompson Falls study area. Notably among these is a population of 60 to 80 bears in Abruzzo National Park in the Apennies Mountains. The park is only 250 square miles in area, slightly smaller than the prime study portion of the Thompson Falls area. Correspondingly, a relic population of approximately 15 bears exists in a 200-square-mile area in Norway (Elkmork, 1962). There are other examples in Asia and in the Americas. The most significant in relation to the Thompson Falls study are two relic populations of grizzlies reported in Mexico (Leopold, 1967 and 1969). One is in the Sierra del Nido, a small, isolated mountain range emerging from the desert of central Chihuahua. This grizzly population was apparently sustaining itself in an area of only 5,000 acres (Cowan, 1972, page 531) until subjected to a campaign of extermination

(Leopold, 1969). The second population is in the upper Yaqui Basin of Sonora in the Sierra Madre, about 100 miles west of the Sierra del Nido (Leopold, 1969).

The foregoing records suggest that the approximate 280 square miles of area contained in the Thompson Falls prime study area is sufficient to fulfill the spatial needs of at least a small grizzly population (ca. 4-8). This assumes that a significant portion of the area is suitable grizzly habitat and that it is not deficient in other respects.

In addition to the 280 square miles included in the prime study area (figure 1), approximately 200 square miles surrounding the prime study area were designated as an infinite study boundary in which management of the grizzly should also be considered. Approximately one-half of this enlarged area is in low-lying country infrequently utilized by grizzlies and heavily impacted by human activity. Consequently, its prime value to the management of grizzly in the Thompson Falls area would not be as basic habitat but rather as a buffer zone. The remaining portion of the infinite contract area, particularly the large Vermillion drainage to the northwest (figure 1), would enlarge the spatial adequacy of the Thompson Falls area for the grizzly. This is deemed so because (1) it incorporates additional high country and open land areas contiguous with the prime study area and (2) it more closely connects the Thompson Falls area with grizzly habitat extant to the north, particularly the Cabinet Wilderness.

HABITAT EVALUATION

Inasmuch as the habitat requirements of the

grizzly bear are ill defined (Erickson, 1974 and 1975) and no hard analytical data exist on the habitat characteristics of the Thompson Falls area, only a judgmental evaluation can be made as to the attractiveness of the area as grizzly habitat. The generalized type map of the Thompson Falls area shows the area broken into an intermixed array of four habitat types based on vegetal life form, degree of conifer canopy cover, and amount of exposed parent soil material; and a fifth category based on recognized land use activities (figure 5).

The preponderant habitat type (approximately 50 to 60 percent) of both the prime and infinite contract area is closed canopy forest where two vegetal strata typically occur: trees and herbs and/or low shrubs. The principal tree dominants in this habitat type are variously subalpine fir and Douglas-fir, Engelmann spruce, lodgepine pine, and western larch and hemlock. These habitats (photos 4 and 5) would generally be considered minimally attractive as grizzly range (Erickson, 1964, 1974, and 1975).

Photo 4. Lower Munson Creek illustrating dense, unbroken forest stand. Such forest areas are poor habitat for the grizzly bear.

Photo 5. Sundance Ridge illustrating dense forest habitat unattractive to the grizzly bear.

The second habitat classification is development area which constitutes approximately 30 percent of both the prime and infinite contract areas. In the main, this classification type comprises logged and roaded area. As such, the type is a classification artifact. Doubtlessly, the majority of this type was formerly mature timber until logged. Consequently, the prelogged habitat character of the Thompson Falls area was approximately 90 percent closed or near closed-canopy forest.

The habitat character of the remaining approximate 10 percent of the Thompson Falls study area is low-density tree communities; grass, herb or shrub land; and talus or bedrock complex (figure 5 and photos 6 and 7). Significantly, the distribution of grizzly historical records and signs of grizzlies observed during the field reconnaissance correspond closely with these types, despite the limited occurrence of this habitat type in the area. The correspondence of the grizzly records to open habitats is even more striking if the occurrence of grizzly records in cutover areas is included (figures 3, 6, and 5). This comparison shows that approximately 90 percent

Photo 6. Alpine meadow between Cabin and Carbine Lakes. Such areas are key foraging grounds for the grizzly.

Photo 7. Mt. Silcox as viewed from Upper Goat Creek. Such herb-talus slopes represent perennial key grizzly habitat. The key to their maintenan e as prime habitat is the periodic occurrence of fire.

of the grizzly records or sign observations were within or immediately adjacent to these open habitats. This observation is not unique. In fact, it is to be expected inasmuch as the habitat preferences of the grizzly are oriented toward more open as opposed to heavy forest habitats (Erickson, 1964 and 1975).

In assessing the non-spatial support sufficiency of the Thompson Falls area as habitat for the grizzly, two evaluations are required: (1) the character of the habitat prior to the extensive development of the area by man and (2) the state of the habitat following development.

As previously discussed, the general predevelopment state of the Thompson Falls area was approximently 90 percent closed canopy forest and 10 percent open canopy forest, meadows, and rugged rocky areas. Only the latter types are judged to be habitats meaningfully supportive of the food needs of bears, particularly grasses and herbaceous and fruit-bearing plants. However, the wide dispersion of the open habitat areas (figure 5) maximizes their significance as grizzly habitat in the Thompson Falls area. Despite this, it is improbable that the amount of habitat attractive to the grizzly prior to development was sufficient to support other than a minimal bear population.

The second evaluation of the Thompson Falls area as supportive habitat for the grizzly concerns the present vegetative and use state of the area. As detailed above, the principal difference between the pre-altered and current state of the forest is the estimated 30 percent of the area which has been subjected to extensive timber cutting, roading, and fire (see beyond and figures 7, 8, and 9). Other development includes some mining and stock grazing (figure 10). These activities have resulted in significant alterations of the original habitat state and doubtlessly have had significant influence on the welfare of the grizzly in the Thompson Falls area. Two types of impact resulted. The first was indirect through alterations of the original habitat state. The second was a direct impact on the grizzly: mortalities resulting from conflicts and hunting. Only the first of these impacts will be addressed here; the direct impact will be discussed in a following section.

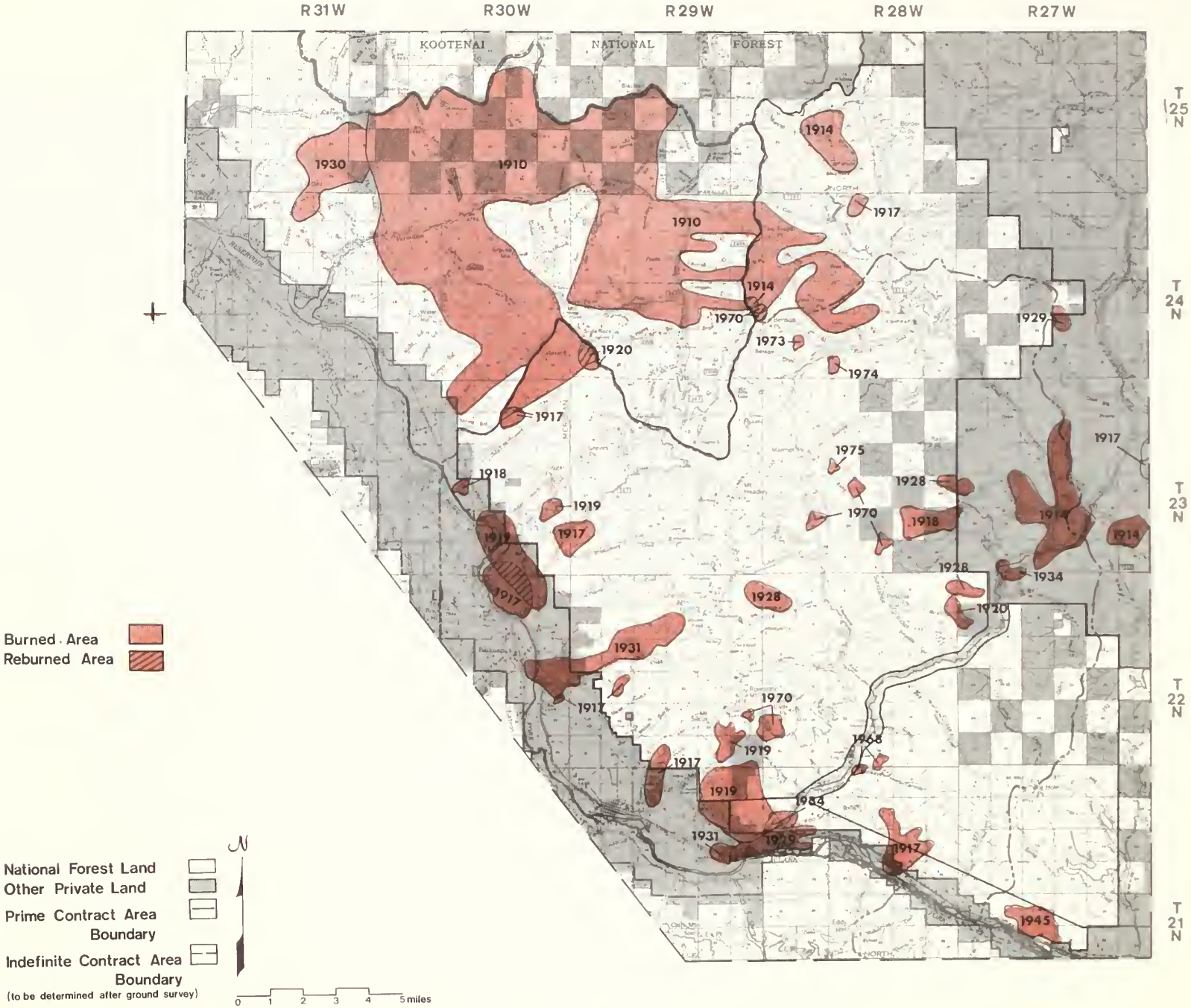

Figure 7. Fire History from 1910 - Present

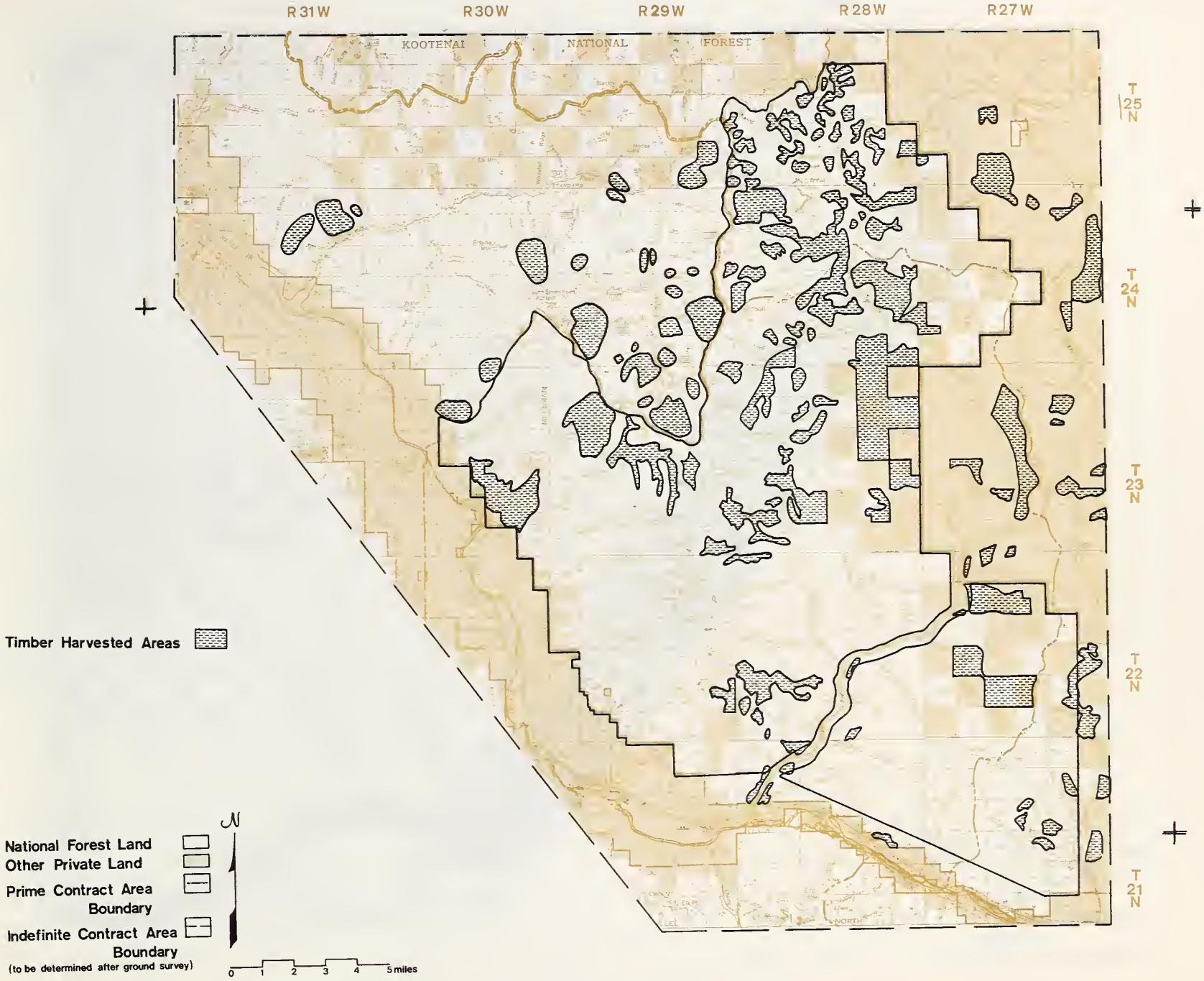

Figure 8. Study Area – General Cutover Map

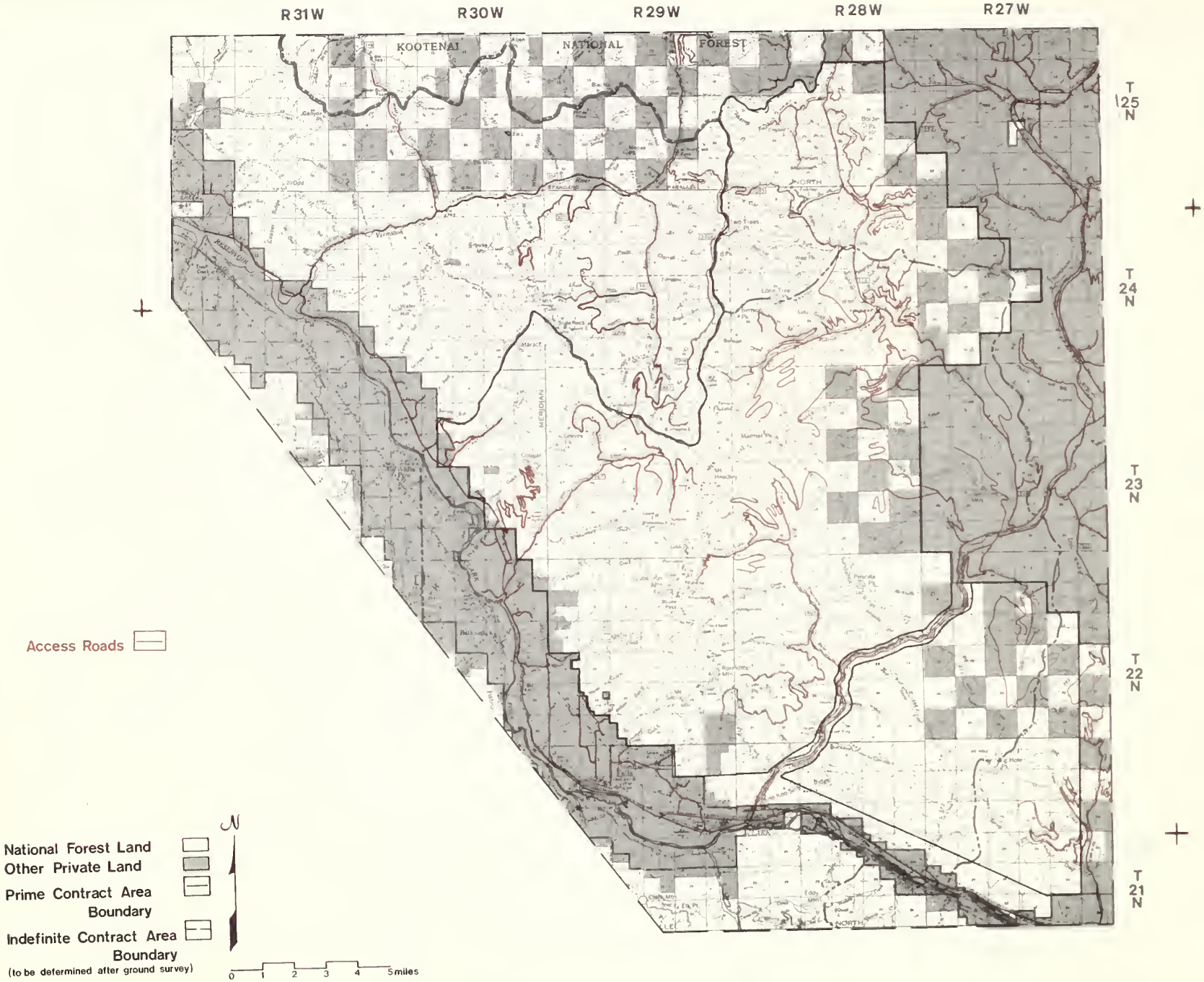

Figure 9. Road Development Map,
within Study Area

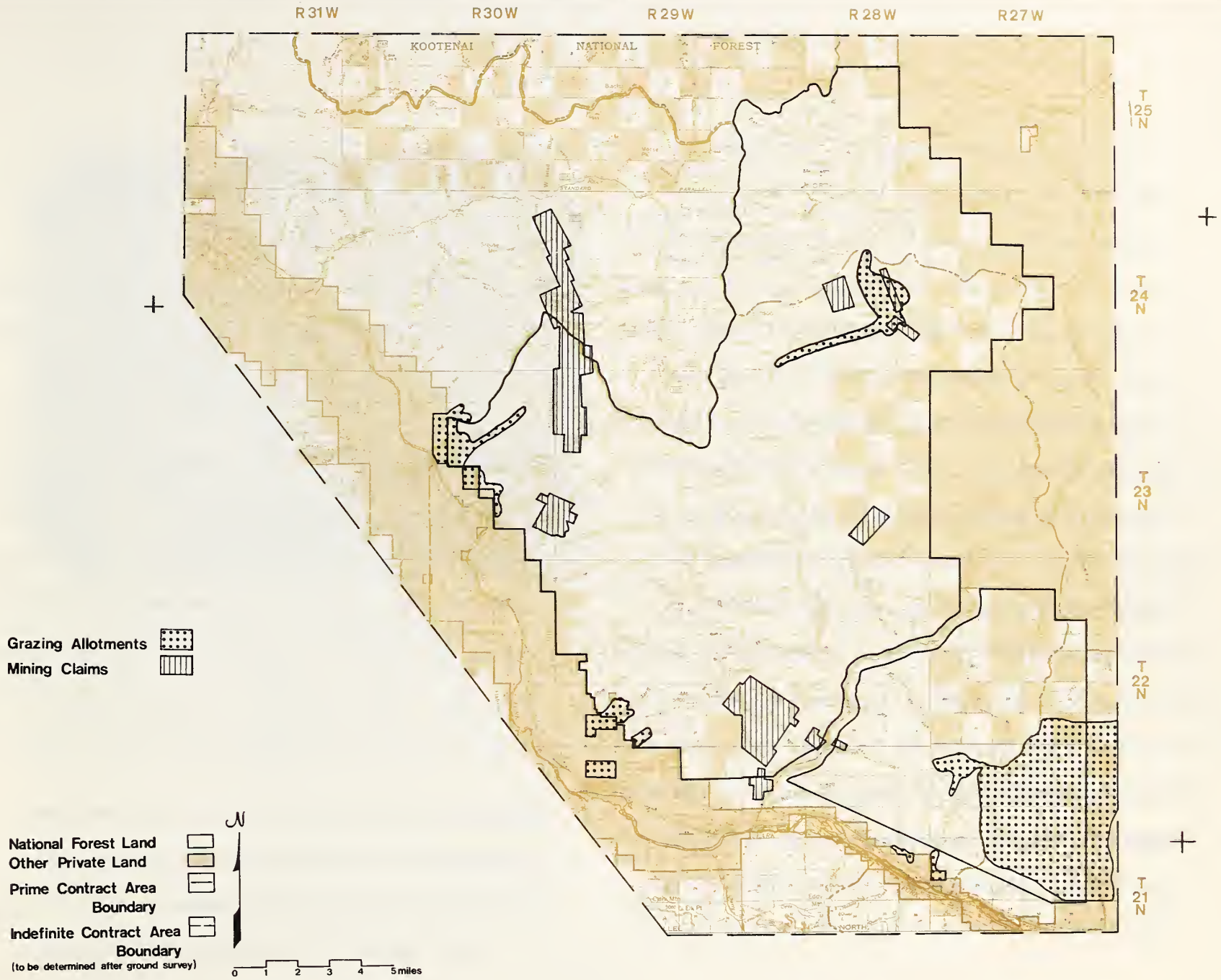

Figure 10. Grazing Allotments and Mining Claims

within Study Area

The advent of resource use and development in the Thompson Falls area resulted in a marked alteration of the habitat characteristics of the area. The first significant use of the area was stock grazing. In part, this activity was accentuated by a number of fires during the early 1900's which temporarily increased the stock grazing potential of the study area (figure 7). The stock grazing potential was presumably never great, but nevertheless, extensive sheep grazing was attempted together with some grazing of cattle and horses. While no detailed examination is made in this report of the distribution of this grazing, it is believed that the grazing had a direct impact on the 10-percent area of the Thompson Falls District identified as attractive grizzly range in its original state. While stock grazing probably did not negatively affect grizzly habitat directly, the activity undoubtedly otherwise affected the grizzly. Not suprisingly, stock depredations by bears and other predators, principally coyotes, led to control measures. Most assuredly some bears were shot on sight. However, of possible greater control on the grizzly were the poisoning activities conducted in the area by stockmen and Governmental agencies. By the 1940's, stock grazing in the area had declined markedly due to a reduced grazing potential as the result of forest succession (photo 8). Today there are only minor grazing allotments in the area for cattle and horses (figure 10).

Concomitant with the use of the area for stock grazing, the Thompson Falls area was actively prospected by miners and a number of major claims

Photo 8. Tree invasion in the subalpine fir-lodgepole forest stand on Sundance Ridge.

were established (figure 10). The direct and indirect effects of mining on the welfare of the grizzly in the Thompson Falls area can only be surmised. It can be assumed that there was some direct negative effect on the grizzly simply due to the presence of man in the area and bears being attracted to human food refuse (Erickson, 1964). Almost invariably bears near such sites develop nuisance tendencies that contribute to grizzly mortality.

The third and most significant development activity in the Thompson Falls area was, of course, timber harvesting and road development. The bulk of this activity occurred during the past 20 years. While no direct information exists of the impact of these activities on the grizzly, the impact potential was profound. Doubtlessly, the most negative effect on the grizzly has been the road access created throughout the area, particularly into the key high country (figure 9). This ready access has enlarged the chances for human-bear contacts and thus increased the chances of direct man-induced bear mortality. Contrarily, the extensive logging of mature timber stands,

rather than diminishing the attractiveness of the area as grizzly habitat in the short term, is judged to have enlarged and enhanced the attractiveness of the Thompson Falls area as bear habitat. This is due to the replacement of mature closed timber stands, which provide relatively little food for the grizzly, by earlier successional stages that provide an abundance of food for the species. Grasses and herbs, abundant in earlier successional stages, are particularly utilized by bears as are the fruits from the later-developing shrubs. The attractiveness of logged areas as bear habitat is, of course, of limited duration and rapidly diminishes at mid-successional stages, particularly if dense, single-species, even-aged stands develop.

CONFLICT PROBLEMS

A prime consideration bearing on the suitability of the Thompson Falls area as habitat for management of the grizzly concerns the potential conflicts between the species and other uses of the Thompson Falls, Plains, and Cabinet Ranger Districts.

The obvious and critical factor would appear to be the compatibility of timber management and the grizzly. At the outset one would assume, on the basis of the high percentage of the area which has already been logged and by what appears to be the substantial amount of prime timber still extant (figures 5 and 8), that a preponderant percentage of the study area is prime timberland. This does not appear to be the case, however. As shown in figure 11, over 100 square miles of the prime study area and another 50-plus square miles of the infinite study area

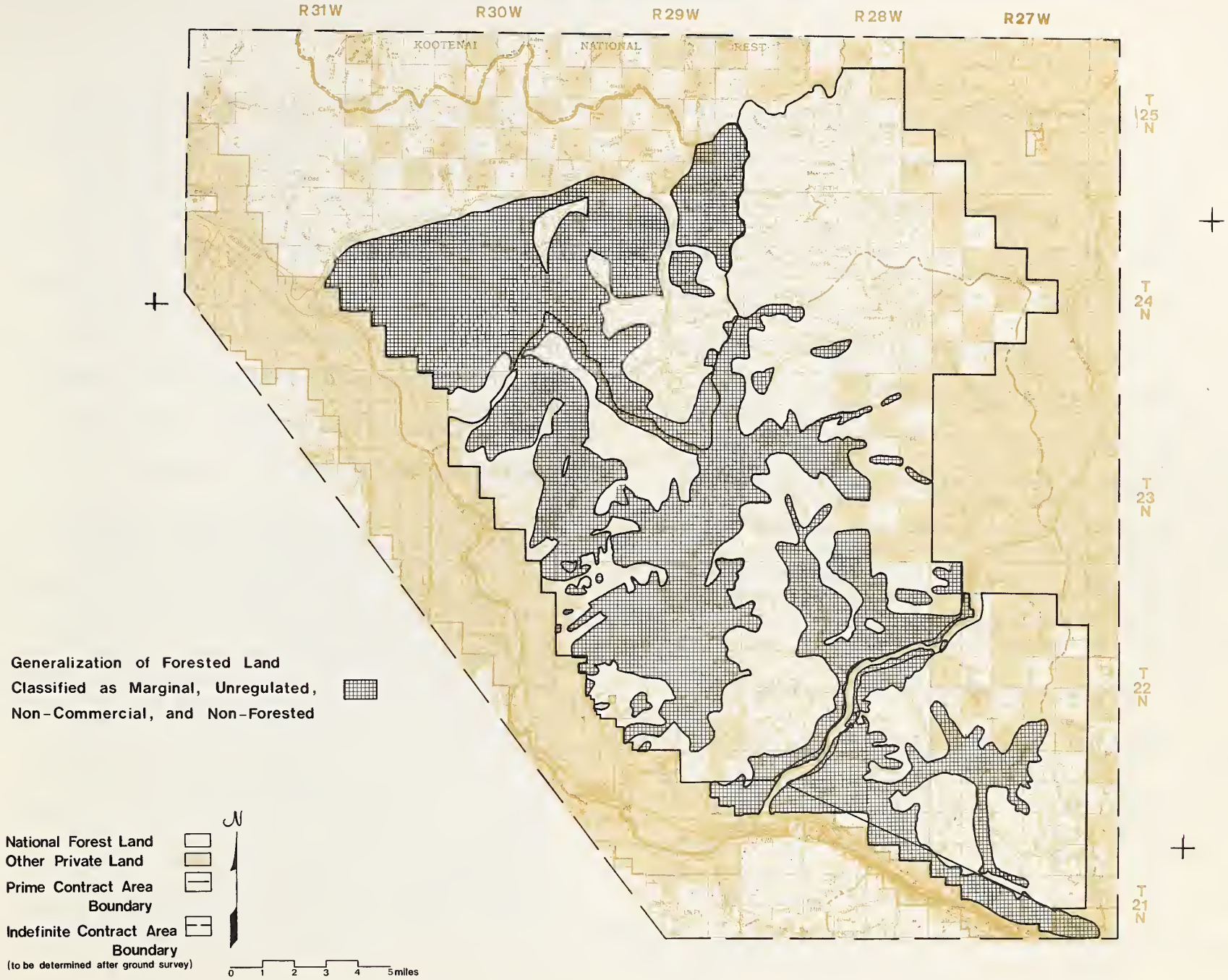

Figure 11. Study Area Marginally Commercial and Non-Forest Land

has been classified by the District as marginally commercial[2/] and non-forest land. Significantly, this area includes the bulk of the high ridge complex and open land areas judged to be attractive grizzly habitat. Accordingly, the options for management of the grizzly in the Thompson Falls area are markedly enlarged, although the major intermixing of the areas classed as commercial, marginally commercial, and non-forest will require a meshing of management approaches for optimal management to benefit the grizzly.

The principal constraint to the management of the grizzly in the Thompson Falls area is the extensive roading (figure 9). This roading provides quick, easy access to almost any portion of the Thompson Falls area during all but the winter months when the bears are in winter dens. As a consequence of this extensive roading, the potential for contacts between grizzlies and humans is great, and increased bear mortality can be expected. A partial solution to this problem would be to limit or control access. This action would have to be weighed against other uses of the area, particularly outdoor recreation.

Two additional possible management conflicts with the grizzly concern mining and stock grazing. Of the two, mining appears to hold the greatest portent of difficulty. The area is highly mineralized and over 20 square miles are currently under claim (figure 10). These claims extend along or impinge upon the ridge complex zone identified as high-potential grizzly habitat. Development of the claims will result in additional direct

2/ Marginally commercial forest includes marginal, unregulated, and non-commercial forest land categories as defined by the U.S. Forest Service, FSM 2400.

access into the key bear country. Despite this, steps could be taken to ameliorate the possible effects of mining activities on grizzlies. Further, once mineral extractions have been completed, restorative actions could be taken.

Very little grazing currently exists in the study area. This occurs only at the periphery of the District (figure 10). There are two principal areas where minor conflicts might develop: the Big Hole Peak area and the Fish Trap Lakes area. Both the historical record (figure 1) and the field reconnaissance (figure 6) identify some grizzly use of these areas. However, there is apparently no great conflict at present between grazing and the grizzly. The portent of conflict would be increased should stock use be increased or if the bear population were to increase.

A final potential conflict of the Thompson Falls area grizzly with other resource management involves recreation. It can be considered axiomatic that high recreational contact between humans and grizzlies will bear negatively on the grizzly. Campgrounds and picnic areas are a near certain source of difficulty inasmuch as bears will be attracted to food refuse in these areas. These associations often result in bears developing nuisance tendencies. A consequence of this is a buildup of bear-human incidents, usually resolved by stringent actions against the bears. The result is a drain on the bear population.

Other recreational uses are less likely to result in this type of conflict. However, any significant amount of contact between grizzlies and humans can be expected to bear negatively on the species, particularly if the widespread carrying

of guns is permitted, in connection with hunting or otherwise, in the prime habitat areas. This is not to imply that the Thompson Falls grizzly population should not be managed as a huntable species. Rather, it is simply the observation that persons bearing firearms in bear country often end up shooting bears.

SUMMARY EVALUATION OF THE THOMPSON FALLS AREA AS GRIZZLY BEAR HABITAT

As was indicated in the evaluation of the spatial requirements of the grizzly and of the habitat characteristics of the Thompson Falls area, the District is deemed sufficiently large and possesses sufficient suitable grizzly habitat to support at least a sparse (ca. 4-8) population of grizzly bears. Central to this objective is the high ridge areas centered on Mt. Headley and the more limited areas of open habitat lying along the southern exposure of this area (figure 5). The potential for managing the grizzly within this limited area rests not so much with how the habitat and bears are managed, but rather with how the surrounding country is managed with respect to the bear and as regards human access.

The principal constraint to the management of the grizzly in the Thompson Falls area at this time is the extensive road access into the potential core management area. Unless vehicular access can be curtailed, there is limited opportunity for positive management of the grizzly in the Thompson Falls area. Conversely, if ready access can be curtailed and human-bear contacts lessened, the potential for maintaining a small but viable population of bears in the Thompson Falls area would be very good. This objective

could be heightened if consideration for the grizzly is incorporated into the Districts' total resource management plan. Particular consideration should be given in the plan to: (1) maintain and enhance the attractiveness of the prime grizzly range, (2) attempt management of the habitat surrounding the core areas as a protective buffer, and (3) attempt to integrate the grizzly management plan of the Thompson Falls and Plains Districts with that of the Kootenai National Forest to the immediate north in order to achieve overall management enhancement for the grizzly in the entire area.

One of the objectives of this study was to evaluate the Thompson Falls District as grizzly habitat relative to that elsewhere in the United States and Alaska. This is a judgmental consideration inasmuch as little basis exists for judging the aboriginal or current attractiveness of the area as grizzly habitat. Despite this, it is safe to say that it is unlikely that the Thompson Falls area was ever high-quality grizzly habitat of the type present in parts of Yellowstone National Park or on the Alaska Peninsula or Kodiak Island. On the other hand, the grizzly habitat extant in the Thompson Falls area appears as attractive for the grizzly as much of the area over which the species was originally and is currently distributed, including the Bob Marshall, Scapegoat, and Cabinet Mountains Wildernesses, and major portions of Glacier National Park. This assessment concerns habitat per se and not the relationship of habitat with other factors bearing on the welfare of the species, including the amount of habitat available.

MANAGEMENT OF THE GRIZZLY IN THE THOMPSON FALLS AREA

Having established in the previous sections that the Thompson Falls area has a potential for management of the grizzly, the question remains as to the form of the management program.

A. The Management Objective

The first grizzly management decision on the Ranger Districts is whether the grizzly bear is to be given particular, equal, or peripheral management consideration in relation to other management uses of the area. Peripheral management would essentially parallel the existing program. Under this management regime, the likelihood of perpetuating a resident stock of bears in the area is exceedingly remote.

As previously discussed, the amount of habitat innately attractive as grizzly habitat in the Thompson Falls area is meager and is in a declining state due to fire suppression. This habitat is extensively intermixed with commercially managed forest areas. As a consequence, the welfare of the grizzly on the Districts has been considerably compromised by road development and related considerations. A continuance of this management program will most assuredly lead to the eventual extirpation of the grizzly from the area.

A second option for management of the grizzly in the Thompson Falls area would, under the multiple use management concept, give equal weighing of the grizzly to other resources of the Districts. Under this option, the relative value of the various areas of the Forest would be assessed for the grizzly and other resources and an attempt would

be made to maximize collective management of the several resources. Areas of prime, peripheral, and non-importance for management of the grizzly would be identified. Areas identified as prime habitat for the grizzly would be given major, if not prominent, consideration for grizzly management. The grizzly would be reciprocally treated in areas of low management potential for the species.

In the Thompson Falls area, the key to the management of the grizzly under the multiple use option is dependent upon procedures under which the species is managed in areas peripheral to the prime grizzly habitats. There are, of course, no definitive boundaries separating areas of heavy use by bear from areas of lesser use. Contrarily, there is good evidence that the species has a decided preference for open habitats and a deference toward dense, closed canopy forest stands. Accordingly, a management program in the Thompson Falls area which would attempt to maintain and enhance the attractiveness of the core areas of grizzly habitat and at the same time attempt to create unattractive habitat in peripheral areas would seemingly provide best management of the grizzly under the multiple use resource management concept.

A final option is a regime wherein the species would be given preferential management status. The degree of preferential consideration could vary, of course, from the extreme to simply weighting the scales toward the species in relation to other resource values.

Extreme positive weighting in favor of the grizzly cannot be justified in the Thompson Falls area because the area is neither sufficiently large nor attractive as grizzly habitat to support

other than a sparse population. Further, a heavy weighting would necessarily impinge on other Forest uses--particularly timber and recreation--where resource values exceed the values to be gained for the grizzly.

In light of the above, management of the grizzly on the Ranger Districts would be most equitable if the grizzly were given slight preferential management consideration relative to other resource values. Unless this is done, there is little likelihood that the species will survive in the area, in which case it could be argued that the species had not been accorded even equal management status relative to other resource values. A weighted preferential stance would also be in accord with the directive of the Chief of the U.S. Forest Service relative to the management of threatened and endangered animal species in National Forests. The management regime proposed in the following sections is premised on this Forest Service position as made operational in the Goals and Objectives of the Northern Region for fiscal years 1976 and 1977.

B. The Management Area

Given the management objective, the next determinant of management of the grizzly on the Ranger Districts is a delineation of the areas in which management might be attempted, as proposed in figure 12. Proposed areas of management are (1) a principal central area in which particular management of the species is proposed, (2) a satellite central area (Big Hole Peak) potentially suitable for particular management, (3) a peripheral border zone of moderate to low value

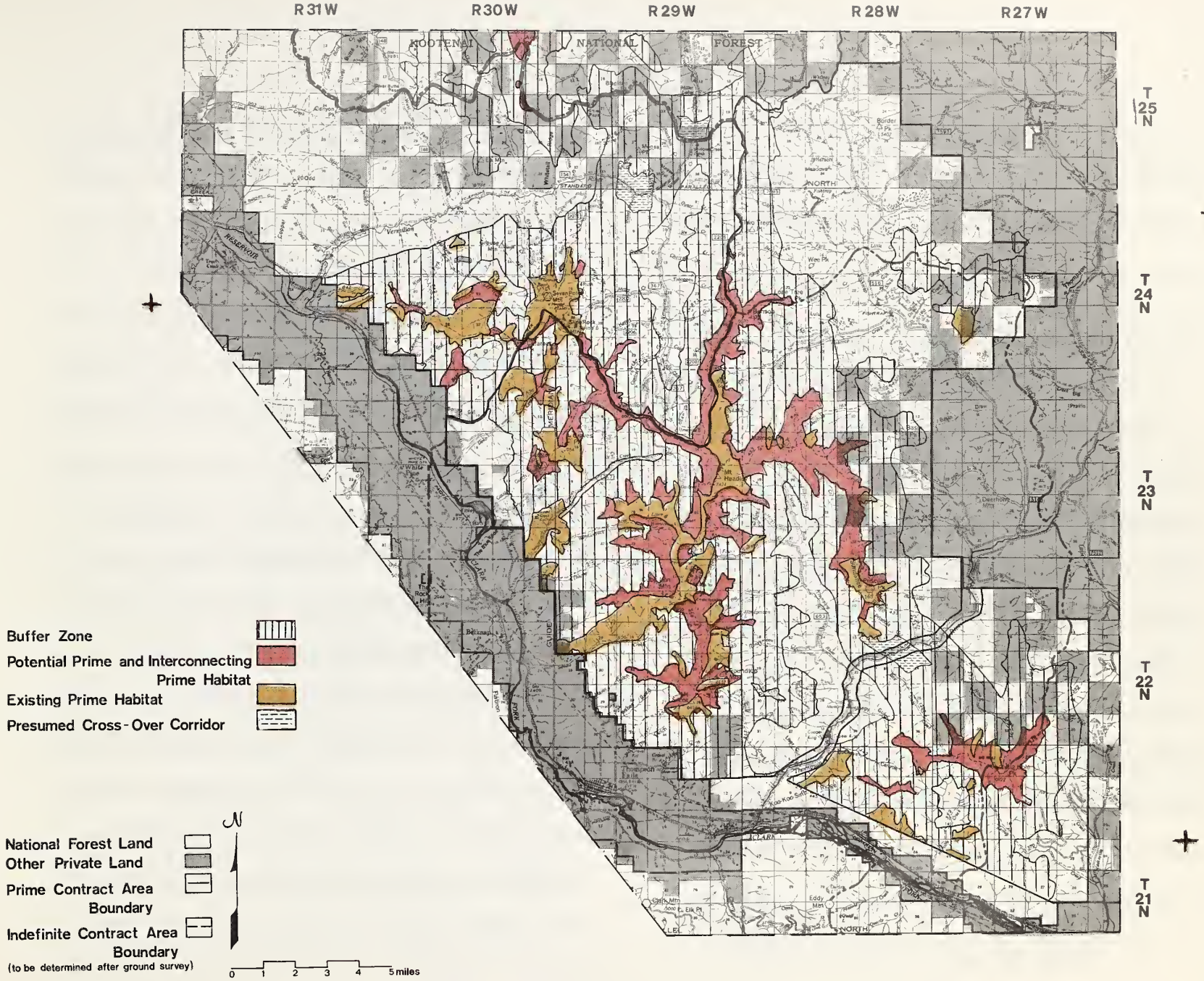

Figure 12. Proposed Grizzly Bear Management Area in the Thompson Falls Ranger District and Adjacent Environs

as a protective buffer to the central core area habitats, and (4) travel corridors connecting disparate core grizzly habitat areas.

The area of key significance to the management of the grizzly in the study area is the upper mountain complex, particularly the ridge area extending from Mt. Silcox on the south to Headley Mountain and Stony Lake to the north. This evaluation is supported by the historical record (figure 3), the signs of bears observed during the field reconnaissance (figure 6), and the evaluation of this area as high-quality grizzly habitat. Specifically managed, the upper mountain complex alone might be capable of supporting a small (ca. 4-8) resident stock of grizzlies. However, sustaining the viability of a small stock of bears in such a limited area could prove very delicate and the results obtained might not justify the effort. It is recommended that the core management area for the Thompson Falls study area be enlarged to the dimensions shown in figure 12. This enlargement would include all of the contiguous mountain complex lying above 6,000 feet, which includes a major proportion of the prime grizzly habitat. Additionally, the area proposed encompasses the open land complex at lower elevations along the south edge of the prime study area including upper Cataract Creek, upper Grimes Gulch and Bear Creek, upper Deep Creek, lower Graves Creek, and all of Squaw Creek (figure 12). A fair percentage of this area is more or less permanent grassland due, presumedly, to the limited moisture in the area as a result of shallow soils and the southwesterly exposure. It is, nonetheless, judged

to be prime grizzly habitat which should be managed in consonance with the Mt. Headley complex. The majority of the southwestern part of the study area has been classified as marginally commercial and non-forest land (figure 11). Consequently, the logical buffer along this zone would be the study area boundary.

Separated from the central core management area is a secondary area of potential prime grizzly habitat, the Big Hole Peak area. This area has a record of use by grizzlies (figures 3 and 6) and the field reconnaissance revealed that the area has significant potential as grizzly habitat. The potential is currently at low ebb, however, due to major forest incursion as the result of fire suppression. If major consideration is given to management of the grizzly in the Big Hole Peak area, approximately 6 square miles of area exists above the 6,000-foot elevation with potential for development into prime grizzly habitat (figure 12).

A logical question at this point is the relationship of the Big Hole Peak area to the central Headley Mountain complex. This can only be surmised. The limited amount of suitable habitat currently extant in the Big Hole Peak area (figure 5) does not appear sufficient to support a resident stock of grizzlies. Consequently, the evidence of the grizzly noted for the area (figures 3 and 6) is judged to have been that of transient animals. Given this, does it follow that the area should not be incorporated into an overall management plan for the study area?

The answer rests with the degree to which the grizzly is to be given management

consideration on the District. If a less than moderately preferential treatment is intended, there is some question of the value of attempting to include the Big Hole Peak area as suitable for management of the species. Conversely, if it is deemed desirable to incorporate the area as a management zone, specific procedures will be required to manage the area in consonance with the Headley Mountain area complex.

Critical in any attempt to manage the grizzly in the study area is the development of a protective buffer zone around the areas of core habitat. Unfortunately, no firm knowledge exists as to what constitutes a suitable buffer area either spatially or compositionally. However, there is evidence that the grizzly shows decided preferences and deferences toward various habitat types. This suggests that successful buffering can be accomplished through habitat management and control of human access in the buffer zone.

While a close delineation of the desired boundaries of either core habitats or buffer areas will require a detailed analysis of the study area, it is proposed that as a working guideline the buffer zone include as a minimum the bulk of those areas above 5,000 feet which surround the core management area(s) or a minimum distance of 1 mile, whichever is less (figure 12). There are, of course, practical considerations relative to the establishment of management areas and, in this instance, some blocking together of the central core area(s), buffer zones, and adjacent areas would seem appropriate to achieve improved area management coordination.

Suggested procedures for the management of

buffer zones are presented in a following section.

A final consideration bearing on the management area determination is the relationship of the management of the grizzly in the Thompson Falls area with the Kootenai National Forest, particularly the Cabinet Mountain Wilderness 5 miles to the north of the study area.

While the Thompson Falls area is believed to be large enough to be managed for a small, isolated bear population, it is possible that a more viable management program might result by interrelating management of the Thompson Falls and the adjacent areas of the Kootenai National Forest. The efficacy of this stance is that the sum support capabilities of the two areas may exceed their separate potentials. Further, some bears, particularly young males, can be expected to be struck with the wanderlust. If the thrust of this travel can be directed away from areas where the animals are not wanted, they would be subjected to fewer mortality influences. A third reason for integrated management is that one area may experience difficulties maintaining its stocks. Should this happen, the adjacent area might serve as a continuing repopulation source. The only apparent drawback of an attempt to integrate management would be if the exchange should serve as a mortality drain to the extent that either or both populations might be jeopardized. The portent of this appears slight in view of evidence showing grizzly stocks, particularly reproductive females, as being very resident. Thus, transient animals would likely, in the main, not be critical to stock retention.

Procedures for using travel corridors in integrating the management of disparate grizzly stocks will be discussed in the following section.

C. Habitat Management in the Prime Management Areas

The area proposed as specifically directed to the management of the grizzly in the study area is the ridge complex centered on Mt. Headley and the westerly located southwest slope area (figure 12). Within this area, specific habitat management should be considered as a prime management objective. This does not imply sole management consideration, but rather that management in these areas should give major consideration to the grizzly.

Within the prime management area, positive habitat management should center on converting and retaining as much of the area as possible in early plant successional stages. As currently vegetated, the prime management zone appears to be significantly more extensively and densely forested than during times past. As such, the attractiveness of this zone as grizzly habitat appears greatly diminished (photo 9).

Photo 9. Mt. Headley Ridge complex, believed to be of key importance as grizzly habitat in the Thompson Falls area. Major forest incursion is progressively diminishing the attractiveness of this area as grizzly bear habitat.

The principal vehicle for creating and retaining early vegetational stages in the prime management zones would be fire (photos 10 and 11), perhaps following timber removal. Early development of a fire management policy in these zones is encouraged. The options are controlled burning and limited or no fire control in the management zone. Of the two, it is recommended that early consideration be given to the use of some controlled burning to aid in integrating the presently separated areas of prime habitat. As currently configured, these widely separated areas are isolated by heavy stands of timber (figure 5). Fusing of these areas would,

Photo 10. Open sedge-grassland maintained by fire in subalpine zone, Sundance Ridge.

Photo 11. View of Round Top Mountain from upper Goat Creek. Photo illustrates the importance of fire in maintaining subalpine areas in prime grizzly bear habitat

seemingly, encourage the retention and movement of bears throughout the prime habitat zone. This would be particularly likely if the animals are further diverted through specific habitat management of the buffer zones.

The second principal concern of management in the prime habitat core is security of the animals. This turns, in the main, on the degree to which the species is insulated from direct contact with man. There is question of the efficacy of a major attempt to manage the grizzly in the Thompson Falls area unless consideration is given to limiting the existent high-elevation access into and through the prime management area. The upper Irvs and Graves Creek road net, the Goat Creek-Liver Peak Road, the upper West Fork of the Thompson River road net, the upper West Fork Fish Trap and Beatrice Roads, the upper Control Creek and upper Vermillion River Roads, the upper Miller Creek jeep road, and the main divide road separating the Vermillion and Fish Trap area are particularly damaging to the welfare of the species.

Wholesale closures of these roads are unlikely. However, limitations as to when and how the roads are used could aid in providing security to the bears in the prime management area.

D. Management of the Buffer Zone

To be effective, the buffer zone needs to accomplish two objectives: (1) discourage out-movements of bears from the prime management area, and (2) safeguard the bears within the core management area from undue external influences.

The latter consideration is, of course, largely

a matter of limiting the ready access of humans through the buffer zone. In the main, this concerns road access, but in particular instances, it might also concern pack trails and hiking trails. Developments that promote high recreation use, particularly camping and picnicking, should be curtailed for the reasons previously related.

Procedures for discouraging bears from entering or crossing buffer zones could, conceivably, be best achieved through habitat management. Thus, while timber management is an appropriate and suitable management use of the buffer areas, the management practices employed should be such as to maintain the areas in habitat forms least attractive to the grizzly. This can be expected to vary from situation to situation depending upon vegetation mix, stand ages, topographic factors, etc. As a rule of thumb, the degree of unattractiveness of a given forest stand to the grizzly will vary directly with the extent and density of the stand. Thus, dense, expansive timber stands, as a rule, serve as good habitat buffers to the grizzly (photo 12); open and broken stands are poor barriers. In essence,

Photo 12. Dense spruce-subalpine fir pole age stand, at the head of Charred Creek, representive of a suitable buffer type habitat.

management in buffer areas attempts to allow only a limited amount of light to reach the forest floor, thus inhibiting herbaceous and shrub vegetation from which the grizzly bear derives a significant portion of its diet.

As concerns stand age, "dog hair" and closed pole-aged stands appear least attractive as grizzly habitat except as refuge or shelter areas. Mature stands are less effective as habitat barriers; but if unbroken and expansive, they can serve as effective barriers in most instances. In general, buffer areas can be most effective as behavioral movement barriers if managed on a short- to medium-rotation clearcut basis. Timber harvest cuts which create openings in which forest regeneration would be slow and/or irregular should be avoided in managing timber stands in buffer zones. Openings created by such cuts would tend to attract grizzly bears into and through a buffer zone. To prevent this, cuts should be performed in such manner as to interrupt the continuity of the forest for the shortest possible period of time. In some instances, tree plantings may be required to shorten the reforestation period.

It is proposed that timber cuts in buffer areas be made in a series of narrow belts paralleling the areas of prime grizzly habitat. The harvest belts would, most appropriately, start either adjacent to the areas of prime habitat or at the other edge of the buffer and progress sequentially through the buffer. Ideally, major reforestation of each belt should be realized before the next belt is cut (ca. 10 years). An intermix of cuts extending across or through the buffer zone should be avoided. Such cuts

would break the continuity of the forest stand, and thus, defeat the purpose of the buffer zone. In this context, it is also recommended that strict fire control and control of heavy forest insect infestations be practiced in buffer areas.

The size of a buffer zone to be effective is dependent upon particular cases. Insofar as possible, an attempt should be made to provide a minimum buffer of 1 mile between all areas of prime grizzly habitat and areas of human activity. Within this buffer area, major curtailment of ready human access would be practiced and close attention given to timber management as per the comments above.

E. Management Integration of Disjunct Grizzly Populations

A significant consideration relative to the grizzly in the Thompson Falls area concerns management integration between the two disparate areas of grizzly habitat within the study area and the relation of the Thompson Falls grizzly population with the grizzly population in the Cabinet Mountains.

As presented earlier in this report, the significance of the Big Hole Peak area to the welfare of the grizzly in the Thompson Falls area is questionable. It seems most improbable that the area is sufficiently large and attractive as grizzly habitat to be managed independently of the larger Headley Mountain area. It is questionable whether attempted management of the grizzly in this area would be contributary to the welfare of the species in the Thompson Falls area. This would appear to be so only if the additional area would contribute to the

abundance of the grizzly in the area and this can only be surmised. As currently vegetated (figure 5), the area is of very minimal value as grizzly habitat. Conversely, if a major opening up of the areas above 6,000 feet was achieved, the area could be markedly improved as grizzly habitat and its support potential increased. Significant in this evaluation is the fact that the bulk of the potential Big Hole Peak area suitable for management of the grizzly has been classified marginally commercial and non-forest land. This suggests the area possesses minimal value for timber production and that habitat manipulations to create more attractive grizzly range is a possible option.

Assuming that habitat manipulations favorable to the grizzly are to be exercised in the Big Hole Peak area, the question of whether the area can be viably tied with the Headley area remains. This would seem quite easily accomplished were it not for the fact that the two areas are separated by the Thompson River with major roads and other domestic developments on either side of the river. While these in no way present a physical or psychological barrier to the movements of the grizzly, they, nevertheless, do constitute a threat to the well-being of the animals. This threat involves a strong likelihood that the animals would be attracted to loiter in this area of high human activity with the potential of increased mortality.

In view of this, it would appear that a movement corridor between the Headley Mountain complex and the Big Hole Peak area might be developed. Within this corridor, and particularly along the Thompson River, attempts to limit domestic

development and camping, picnicking, etc., would be made. Further, timber stands on either side of the corridor could be managed as buffers to dissuade bear movements other than through and between the core areas. The most likely site for this corridor appears to be the ridge separating Bay State and Big Hole Creek across to Priscilla Peak (figure 12). All but 1 mile of this natural corridor is classified as marginally commercial and non-forest (figure 5).

Because of the uncertainties as to the potential value of the Big Hole Peak area to the welfare of the grizzly in the Thompson Falls area, serious questions must be raised as to the efficacy of expending much effort in attempts to manage the area for the grizzly. The determination rests with the management emphasis to be given the species. If it is high, the manipulation of the habitat of the area and development of a management corridor would be in order. If of a lesser order of emphasis, major consideration of the area for management of the grizzly should be deferred at this time and management emphasis should be concentrated on the Central Mountain area.

In many respects, any attempt to integrate management of the Thompson Falls grizzlies with those of the Cabinet Wilderness is similar to the situation involving the Big Hole Peak and Headley Mountain populations. The principal difference is that both the Thompson Falls and Cabinet Wilderness areas are presumed capable of supporting independent resident grizzly populations. There is, however, the possibility that combining the areas is important to the welfare of the grizzlies of both areas

or that one area is critical to the maintenance of grizzlies in the total area. If so, it seems quite certain that the Thompson Falls area would be the recipient area. There is the possibility, too, that the two areas are synergistic to the total population of the area. Regardless, it would appear prudent to provide for assimulative management of the two areas.

At the minimum, an attempt should be made to establish an access travel corridor for bears between the Thompson Falls area and Cabinet Wilderness. The principal consideration is the early identification of a corridor to prevent corridor developments that might later prove derogatory to future management of the area as a movement corridor.

The principal concern with integrating management between the two areas is the major road and domestic developments along the Vermillion River.

While no precise corridor is proposed, logical crossover sites would appear to be in the Willow Creek Pass area or between Hunter Draw Creek and Sparrow Gulch (figure 12).

CRITICAL HABITATS

An objective of the study was the identification and delineation of key or critical habitats of the grizzly. Unfortunately, there are few criteria permitting the precise identification and delineation of key or critical habitats. It is a near certainty that in the Thompson Falls area the open habitats of the upper mountain complex are the key areas of use, mainly as foraging sites. However, as the open habitat areas are disparate, those areas through which the bears move between prime forage zones must also be considered critical to the welfare of

the species in the area. The same could be said regarding the buffer zone and travel corridors. This stance somewhat begs the issue, but nonetheless, illustrates the complexity of the issue.

From a basic support standpoint, the key habitats of the grizzly in the Thompson Falls area are the high open areas which provide the principal foods of the species. Consequently, the attraction of these habitats establishes the base potential of the grizzly in the area, irrespective of other influences, such as human-induced mortality.

ADDITIONAL STUDY NEEDS

This report is lacking in detail. A finer evaluation would require studies in far greater detail than were possible in this investigation. Close evaluation of the area will be required to delineate precise management boundaries, travel corridors, etc. The same holds as regards habitat management, whether positive as required in the prime management areas or negative as in the buffer zones. A particular management challenge which will require study is the development of procedures for handling the human access problem. Whether this should include total road closures, graded closures, or other procedures will require detailed considerations of many factors. These judgments would be relatively simple if the grizzly bear were the only resource of concern. But, of course, this is not the case.

Any attempt to positively manage the grizzly in the Thompson Falls area should give some consideration to monitoring the population status of the species in the area. This has not been done to

the present time by either the Montana Department of Fish and Game or the Forest Service. A minimal monitoring program should include establishing procedures for documenting grizzly observations in the area and accurately assessing human-caused mortalities, including legal kills. This can be accomplished, in part, through the District's guide report requirement and the current compulsory reporting program of the Montana Department of Fish and Game.

While general observational and reporting data would be important sources of population information, they would not be particularly specific in meaning. To address the need for more specific data, it is recommended that some form of annual census be attempted. This should include systematic annual searches of specific areas for bear sign, particularly spring searches for bear tracks in the snow. While the data developed would likely prove highly variable from year to year, they would--together with the general observation record and reporting program--provide valuable information on population trends. Ideally, of course, even more detailed censuses or surveys might be developed.

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